What is claimed is:

1. A process for producing polymer moldings (M/T/B) with functional surfaces (O) for which

(I) a coating (B) is produced on a thermoplastic support sheet (T) by

(I.1) coating one surface (T.1) of (T) with at least one pigmented coating material (B.1) and

(I.2) coating the resulting film (B.1) with at least one chemically curable coating material (B.2) to give the film (B.2) which following its curing gives a transparent coating (B.2),

(II) the resulting coated thermoplastic support sheet (T/B) is inserted into an open mold,

(III) the mold is closed and the uncoated side (T.2) of the coated thermoplastic support sheet (T/B) is contacted with a liquid polymeric material (M) to shape the coated thermoplastic support sheet (T/B) and join it firmly to the polymeric material (M), and the polymeric material (M) is caused to solidify, and

(IV) the resulting coated polymer molding (M/T/B), whose coating (B) is uncured, part-cured or full-cured is removed from the mold; where

(V) in step (I) and/or after the end of step (I) and/or in step (III) and/or after step (IV) the uncured or part-cured coating (B) is fully cured or after step (IV) the full-cured coating (B) is aftercured;

the coating (B) being covered at least temporarily with a protective sheet (S), wherein the protective sheet (S) has

(s.1) a storage modulus E' of at least 10^7 Pa in the temperature range from room temperature to 100°C,

(s.2) an elongation at break > 300% at 23°C longitudinally and transversely to the preferential direction produced by means of directed production processes in the production of (S),

(s.3) a transmittance > 70% for UV radiation and visible light with a wavelength of from 230 to 600 nm for a filmthickness of 50 µm

and wherein the coating (B)-facing side (S.1) of the protective sheet (S) has

(s.1.1) a hardness < 0.06 GPa at 23°C and

(s.1.2) a roughness corresponding to an R_a from 50 μm^2 < 30 nm as determined by means of atomic force microscopy (AFM)

2. The process as claimed in claim 1, wherein the protective sheet (S)

(s.1) has a storage modulus E' of from 10^7 to 10^8 Pa.

3. The process as claimed in claim 1 or 2, wherein the protective sheet (S)

(s.2) has an elongation at break of from 400 to 900%.

4. The process as claimed in any of claims 1 to 3, wherein the coating (B)-facing side (S.1) of the protective sheet (S)

(s.1.1) has a hardness < 0.02 GPa.

5. The process as claimed in any of claims 1 to 4, wherein

(s.5) the removal of the protective sheet (S) from the coating (B) requires an averaged force < 250 mN/cm.

6. The process as claimed in any of claims 1 to 5, wherein the protective sheet (S) is selected from the group consisting of films made of polyethylene, polypropylene, ethylene copolymers, propylene copolymers, and ethylene-propylene copolymers.

7. The process as claimed in any of claims 1 to 6, wherein the side (S.1) of the protective sheet (S) has adhesive properties.

8 A process as claimed in any of claims 1 to 7, wherein the side (S.2) of the protective sheet (S) that faces away from the coating (B) has antiblocking properties

9. The process as claimed in any of claims 1 to 8, wherein the protective sheet (S) is constructed from a plurality of layers.

10. The process as claimed in claim 9, wherein the protective sheet (S) is constructed from at least one core layer (KNS) made of at least one homopolymer or copolymer and from at least one further layer selected from the group consisting of adhesive layers (KS) and antiblocking layers (AS).

11. The process as claimed in claim 10, wherein the homopolymers and copolymers of the core layer (KNS) are selected from the group consisting of polyethylene, polypropylene, ethylene copolymers, propylene copolymers, and ethylene-propylene copolymers.

12. The process as claimed in any of claims 1 to 11, wherein the thickness of the protective sheet (S) is from 10 to 100 µm.

13. The process as claimed in any of claims 1 to 12, wherein the protective sheet (S) is applied to the coating (B) after step (I).

14. The process as claimed in any of claims 1 to 13, wherein the protective sheet (S) is removed from the coating (B) of the coated, thermoplastic, protective-sheet (S)-covered support sheet (T/B/S) immediately before step (II).

15. The process as claimed in any of claims 1 to 13, wherein the protective sheet (S) is removed from the coating (B) of the protective sheet (S)-covered polymer molding (M/T/B/S) after step (IV).

16. The process as claimed in claim 15, wherein the protective sheet (S) is removed from the coating (B) before or after the coating (B) has been fully cured or before or after the polymer molding (M/T/B) has been aftertreated.

17. The process as claimed in any of claims 1 to 16, wherein the thermoplastic support sheet (T) has a film thickness $\geq$ 0.5 mm.

18. The process as claimed in any of claims 1 to 17, wherein the coated thermoplastic support sheets (T/B) or the cut-to-size pieces thereof are preformed prior to step (II).

19. The process as claimed in claim 18, wherein the coated thermoplastic support sheets (T/B) or the cut-to-size pieces thereof are adapted to the contours of the molds.

20. The process as claimed in any of claims 1 to 19, wherein the functionality of the surface (O) of the polymer moldings (M/T/B) is one which imparts color, effect, color and effect, electroconductivity, magnetic shielding, inhibition of corrosion, fluorescence and/or phosphorescence.

21 The use of the polymer moldings (M/T/B) produced by means of the process as claimed in any of claims 1 to 20 for producing means of transport, constructions, windows, doors, furniture, and utility articles.

22. The use of a sheet having

(s.1) a storage modulus E' of at least 10^7 Pa in the temperature range from room temperature to 100°C,

(s.2) an elongation at break > 300% at 23°C longitudinally and transversely to the preferential direction produced by means of directed production processes in the production of (S),

(s.3) a transmittance > 70% for UV radiation and visible light with a wavelength of from 230 to 600 nm for a path length of 50 µm

where at least one surface of the sheet has

(s.1.1) a hardness < 0.06 GPa at 23°C and

(s.1.2) a roughness corresponding to an R_a from 50 μm^2 < 30 nm as determined by means of atomic force microscopy (AFM),

as protective sheet (S) in the production of polymer moldings.